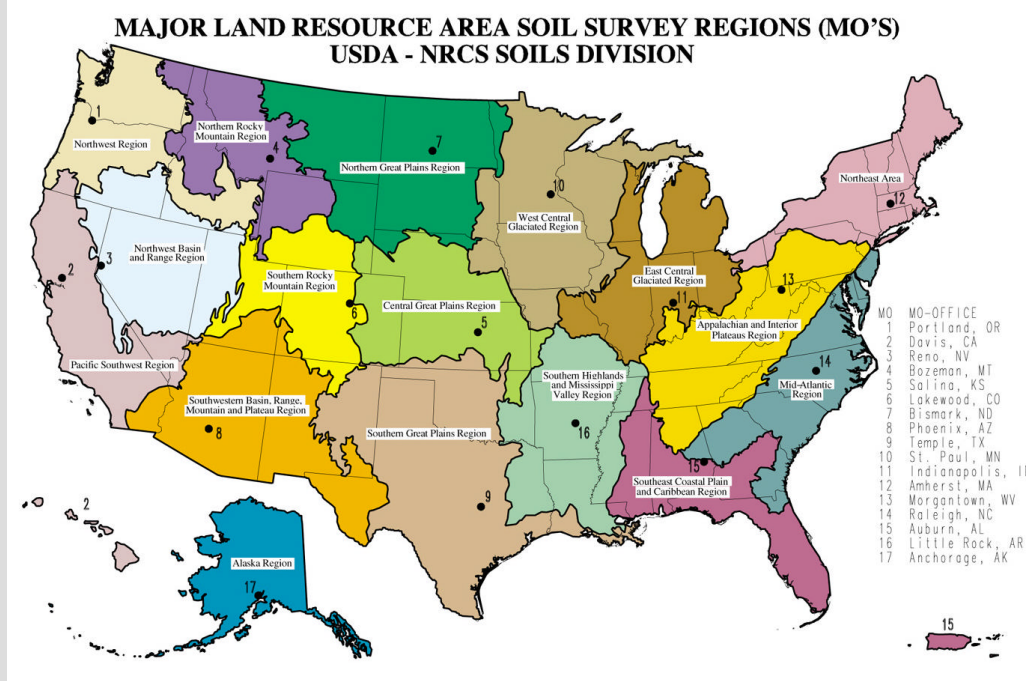


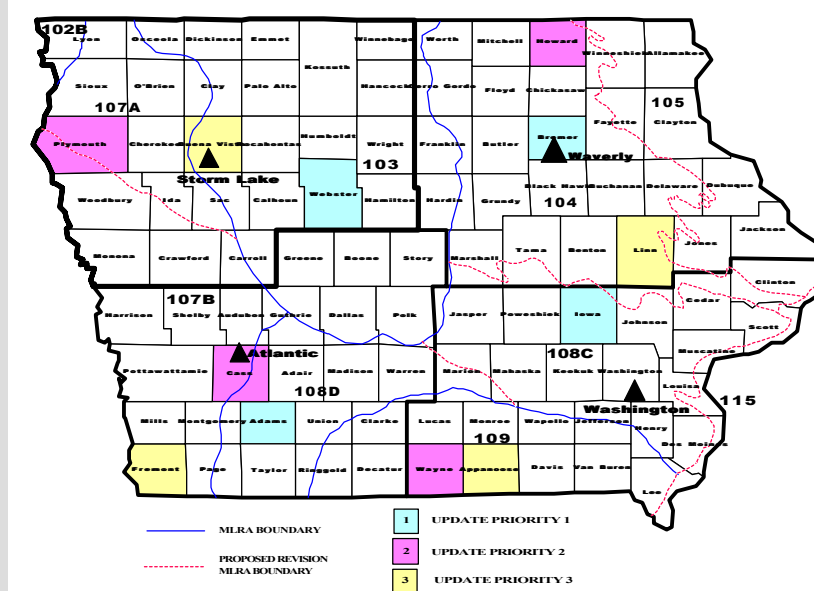
21st Century Challenges of the

James R. Culver, National Leader, Soil Survey Technical Services, National Soil Survey Center, USDA-NRCS, Lincoln, NE

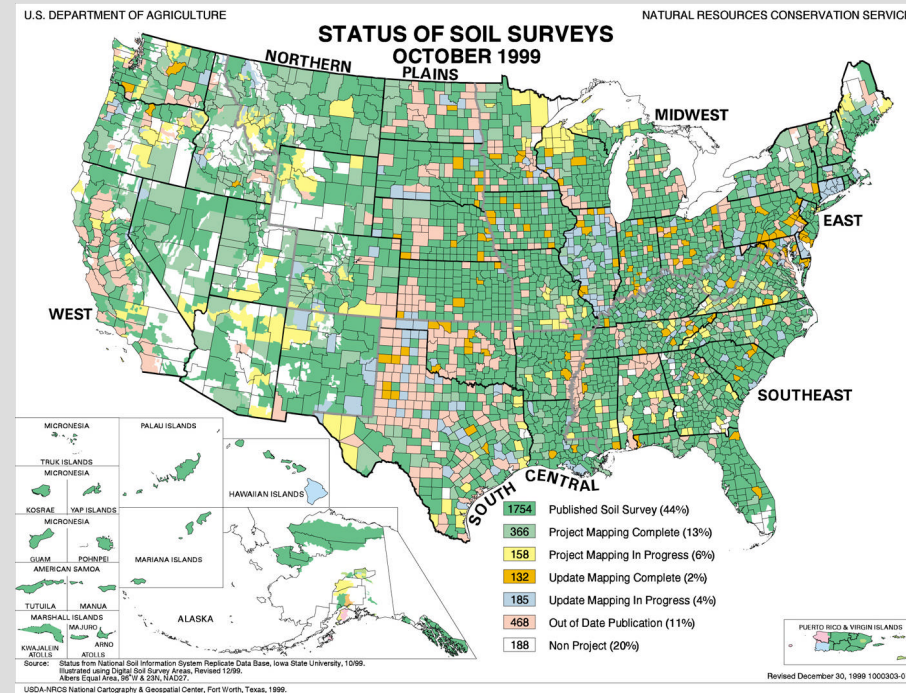
MLRA Soil Survey Maintenance



Soil surveys are organized by 17 distinct natural geo-graphic Major Land Resource Areas (MLRAs).



Iowa has implemented Super Soil Survey Project offices. These offices include soil scientists and other interdisciplinary staff who maintain and use quality soil survey information.



Excellent progress has been made in completion of soil surveys on private lands. The soil survey of the future is continually being maintained. This concept will replace re-mapping of an outdated soil survey every 20 to 30 years.

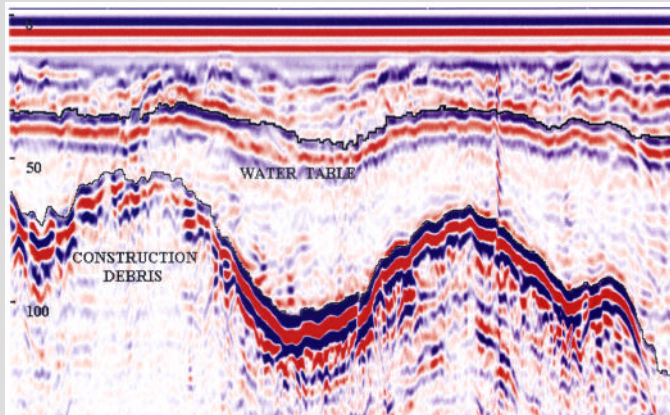


Trained field soil scientists collect new data and verify remotely-sensed data.

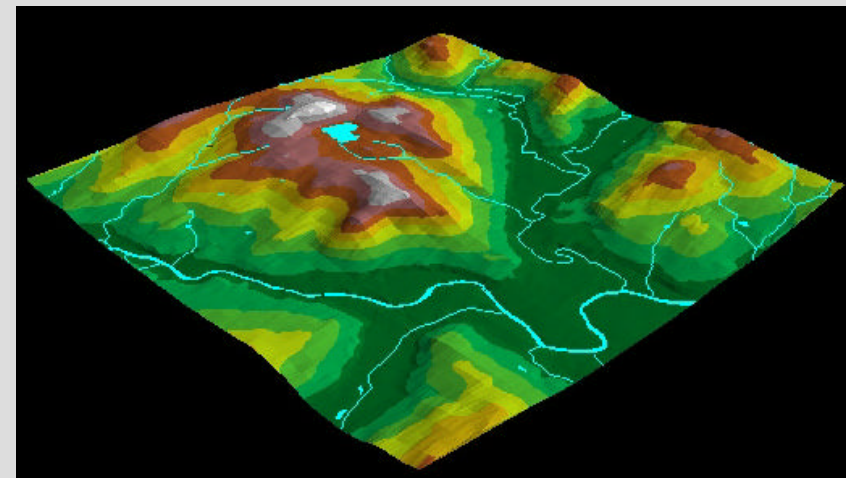
Field Techniques



Soil scientists of the future will use pen-based PCs (such as this Hammerhead) that displays digital orthophotography to electronically record soil map information in the field.



Ground-penetrating radar (GPR) is used to determine the depth to water table and construction debris.



Computer-generated slope maps produced from digital orthophotography will help maintain quality soil surveys.



New lab methods are needed to make soil interpretations of the future.



Deep soil coring data helps in understanding landscape relationships.



Geophysical equipment efficiently collects accurate soil data. This EM 38 is being used on a groundwater contamination investigation.

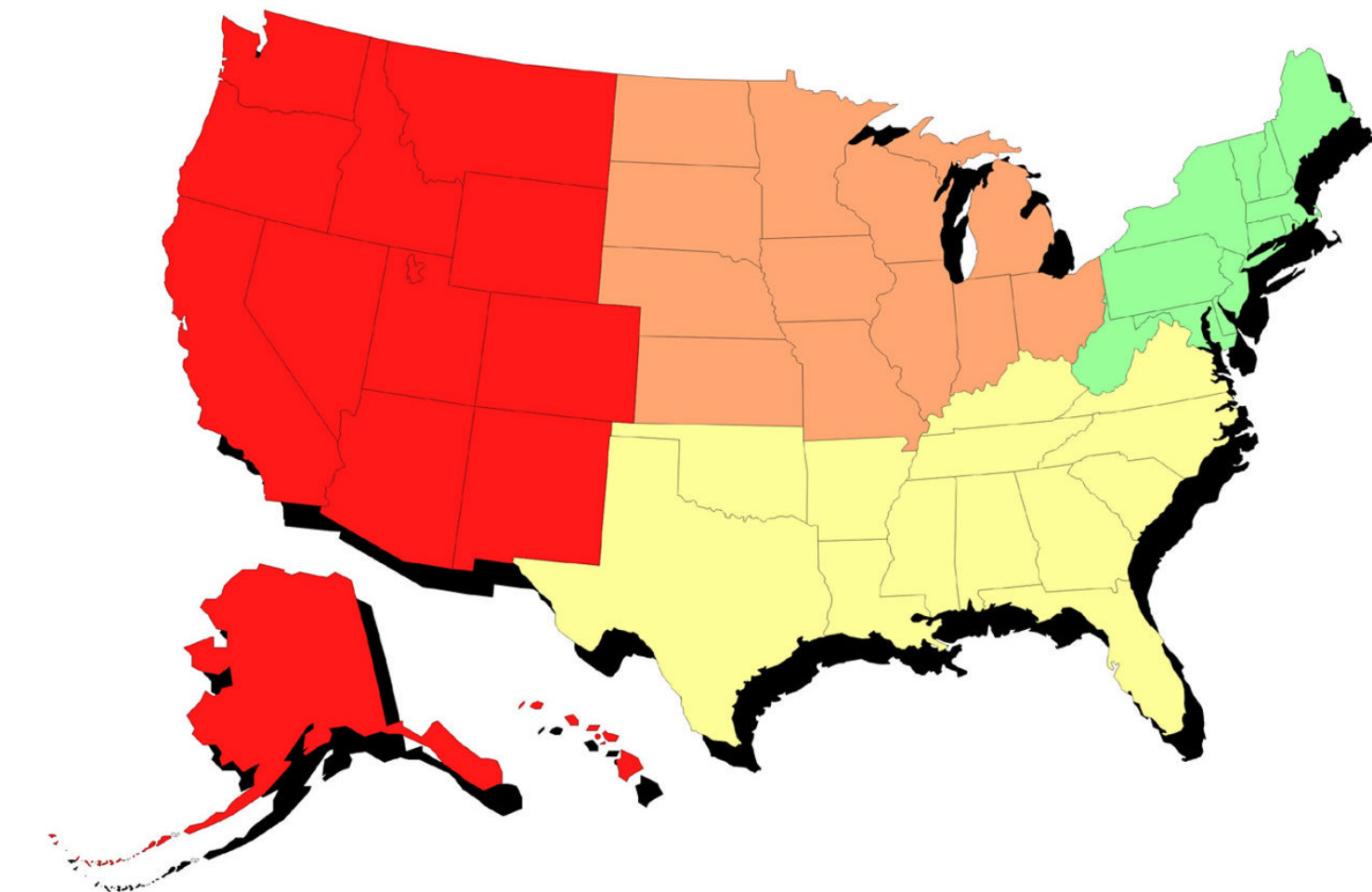


Internationally, National Cooperative Soil Survey soil scientists are leaders in transfer of soil science.



The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD). To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice or TDD). USDA is an equal opportunity provider and employer.

National Cooperative Soil Survey Conference Regions



Western North Central Southern Northeastern

National and Regional Cooperative Soil Survey Conferences provide the leadership for the science, standards, and application of soil survey information. National Conferences are held in odd-numbered years and Regional Conferences are held in even-numbered years.

The USDA - Natural Resources Conservation Service provides the leadership for the National Cooperative Soil Survey. Membership by Memorandum of Understanding for the National Cooperative Soil Survey Conference includes the following:

Agricultural Stabilization and Conservation Service, U.S. Department of Agriculture
Bureau of Indian Affairs, U.S. Department of the Interior
Bureau of Land Management, U.S. Department of the Interior
Bureau of Reclamation, U.S. Department of the Interior
Defense Mapping Agency, U.S. Department of Defense
Economics and Statistics Service, U.S. Department of Agriculture
Environmental Protection Agency
Federal Crop Insurance Corporation, U.S. Department of Agriculture
Forest Service, U.S. Department of Agriculture
National Bureau of Standards, U.S. Department of Commerce
National Oceanic and Atmospheric Administration, U.S. Department of Commerce
National Park Service, U.S. Department of the Interior
National Society of Consulting Soil Scientists, Inc.
Natural Resources Conservation Service, U.S. Department of Agriculture
Office of Territorial Affairs, U.S. Department of the Interior
Science and Education Administration, U.S. Department of Agriculture, Extension, CRIS
Tennessee Valley Authority (quasi-federal)
U.S. Army Corps of Engineers, U.S. Department of Defense
U.S. Fish and Wildlife Service, U.S. Department of the Interior
U.S. Food and Drug Administration, U.S. Department of Health and Human Services
U.S. Geological Survey, U.S. Department of the Interior
State Agricultural Experiment Stations

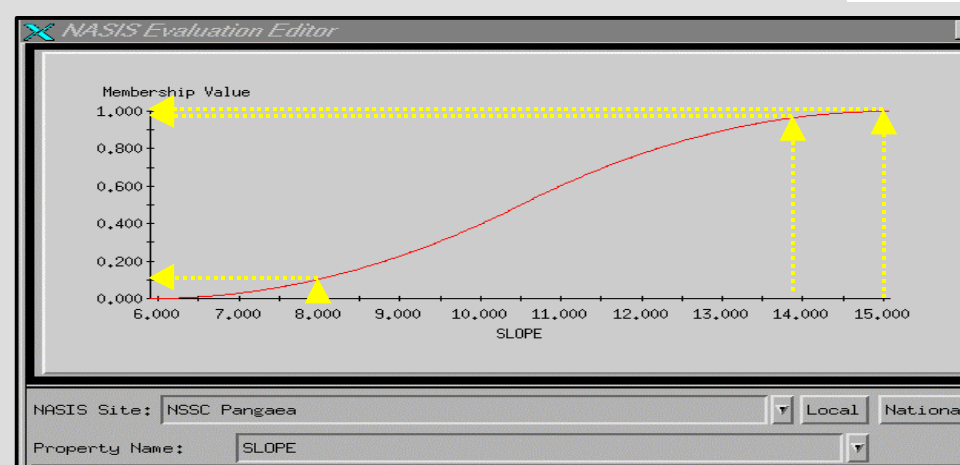
National Cooperative Soil Survey

Tammy J. Nepple, Visual Information Specialist, National Soil Survey Center, USDA-NRCS, Lincoln, NE



National Soil Information System

NASIS

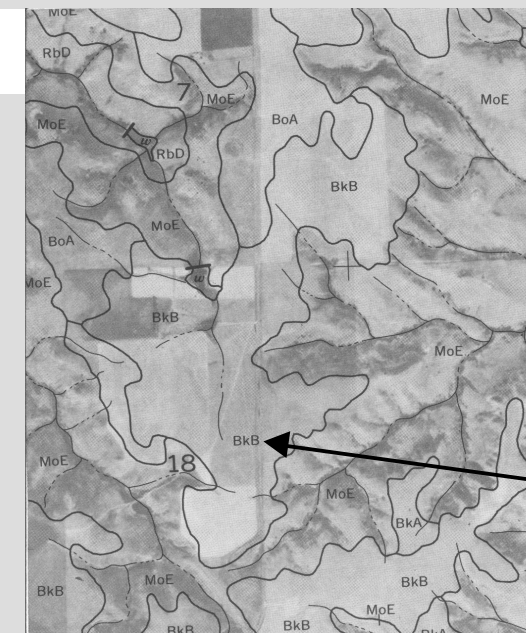


New concepts in the development of soil interpretations.



Soil interpretations for buffer strips.

Soil map.



Rating criteria for buffer strips.

RATING CRITERIA 1/	RANGES FOR FILTER STRIPS			RANGES FOR CONTOUR BUFFER STRIPS			RESTRICTIVE FEATURE
	NOT LIMITED	LIMITED	LIMITED	NOT LIMITED	LIMITED	LIMITED	
AVAILABLE WATER CAPACITY (cm)	>15	10-15	<10	>15	10-15	<10	DROUGHTY
SALINITY (EC)(umhos/cm)	<4	4-8	>8	<4	4-8	>8	EXCESS SALT
MOISTURE REGIME	NOT ARIDIC OR TORRIC SUBGROUP	---	---	NOT ARIDIC OR TORRIC SUBGROUP	---	---	TOO ARID
DEPTH TO RESTRICTIVE LAYER (cm)	<5	5-15	>15	<5	5-15	>15	TOO COBBLY
USDA TEXTURE (Percent)	>100	50-100	<50	>100	50-100	<50	RESTRICTED ROOTING DEPTH
POISONING DURATION (Longevity Limit)	---	---	ICE	---	---	ICE	PERMAFROST
BULK DENSITY (g/cc)	<1.35	>1.35 - 1.8	>1.8	<1.35	>1.35 - 1.8	>1.8	PONDED
FLOOD FREQUENCY	NONE	VERY RARE	FREQ.	NONE	VERY RARE	FREQ.	FLOODING
PERCOLATION (umhos)	<4 OR <42	---	---	<4 OR <42	---	---	TOO SLOW OR TOO RAPID
SURFACE REACTION (pH)	<5.5	5.5-6.5	>6.5	<5.5	5.5-6.5	>6.5	TOO ACID
ADSORPTION RATIO (SAR)	<4	4-13	>13	<4	4-13	>13	EXCESS SODIUM
CLAY ACTIVITY (CEC)(cmol(+)g-1))	<8.15	8.15-8.85	>8.85	<8.15	8.15-8.85	>8.85	ADSORPTION
DEPTH TO HIGH WATER TABLE (45-100cm)	>100	45-100	<45	>100	45-100	<45	WETNESS
SLOPE	2	>2 - <6	>6	4	>4 - <8	>8	TOO STEEP

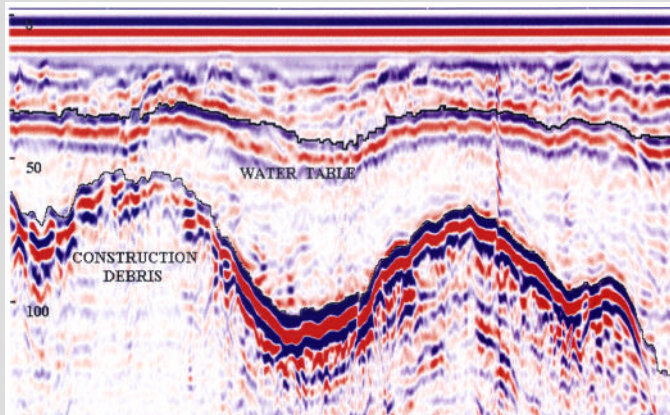
Soil interpretations for buffer strips.

TABLE 3A U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE Interpretation Result Listing Buffer Strips-Test Data: Detailed Soil Map Legend	
MAPUNIT COMPONENT	AGR-CONTOUR BUFFER STRIPS
BkB BLACKPIPE	0.763 Limited *+ 0.763 Moderately Limit AGR-Available Water Capacity 0 0.423 Moderately Limit AGR-Soil Depth 0 to >100cm 0.009 Favorable AGR-Bulk Density (0-100 cm)

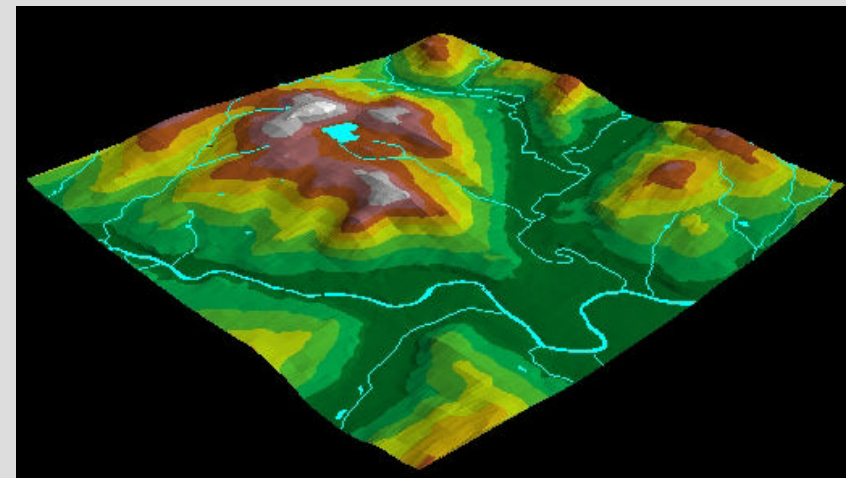
Soil Survey Application



Soil scientists of the future will use pen-based PCs (such as this Hammerhead) that displays digital orthophotography to electronically record soil map information in the field.



Ground-penetrating radar (GPR) is used to determine the depth to water table and construction debris.



Computer-generated slope maps produced from digital orthophotography will help maintain quality soil surveys.



New lab methods are needed to make soil interpretations of the future.



Deep soil coring data helps in understanding landscape relationships.



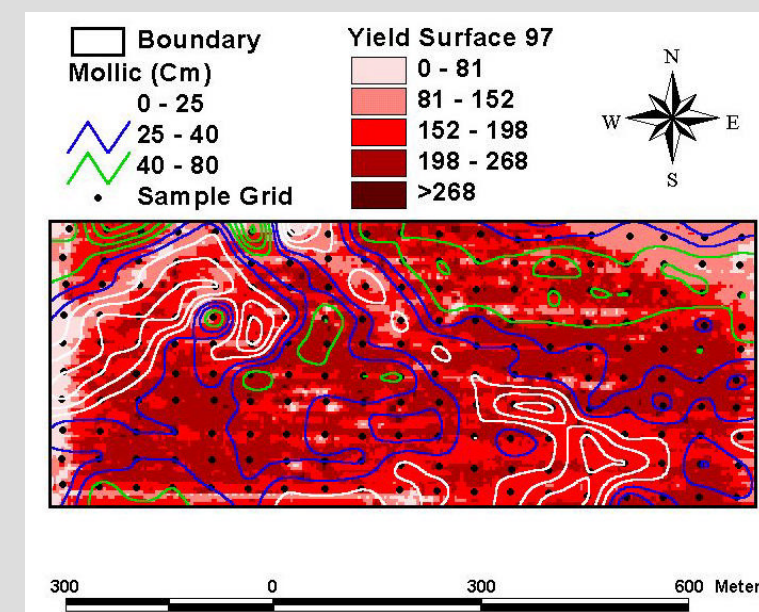
Geophysical equipment efficiently collects accurate soil data. This EM 38 is being used on a groundwater contamination investigation.



Internationally, National Cooperative Soil Survey soil scientists are leaders in transfer of soil science.



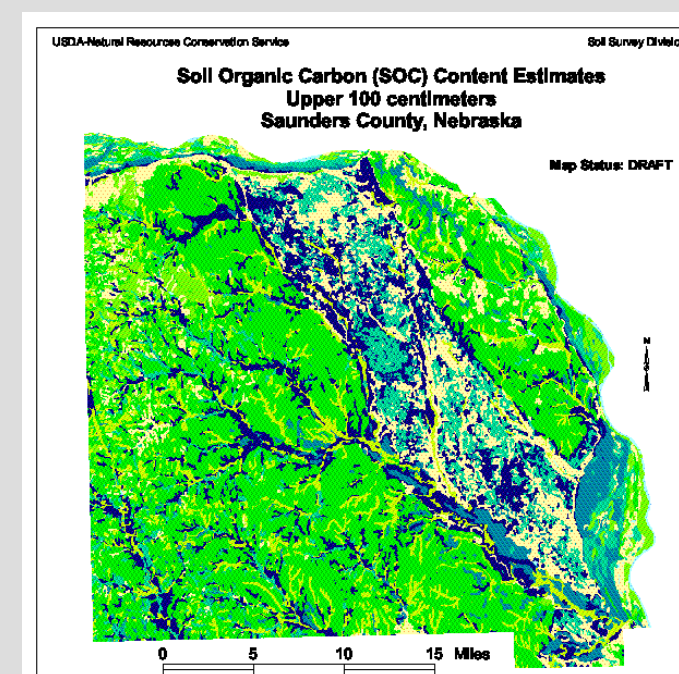
The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD). To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice or TDD). USDA is an equal opportunity provider and employer.



The use of soil surveys in site-specific management continues to increase.



Soil scientists installing soil moisture and temperature monitors to study current and future climatic trends.



Soil carbon map for Saunders County, Nebraska.

Soil information is readily available on CD-ROM.



The NSSC webpage contains current information on 21st century soil survey.

